

WHAT IS CLAIMED IS:

1. A method to detect a change in a condition of a system comprising:

a. sensing the condition of the system and capturing data values indicative of the sensed condition;

b. periodically determining a difference between a first data value and a second data value;

c. determining a characteristic representative of a series of differences representative of a predetermined period;

d. comparing the characteristic to at least one threshold level, and

e. generating an alarm if the characteristic is beyond the threshold level.

2. A method as in claim 1 wherein the system is an operating machine.

3. A method as in claim 1 wherein the condition is vibration in the system.

4. A method as in claim 1 wherein the condition is a temperature of the system.

5. A method as in claim 1 wherein said data is collected at predetermined time intervals and further

comprising collecting time data indicative of a time corresponding to an occurrence of each data value.

6. A method as in claim 1 wherein the characteristic representative of the series of differences is a mean value of the differences.

7. A method as in claim 1 wherein the characteristic representative of the series of differences is a median value of the differences.

8. A method as in claim 1 wherein the characteristic representative of the series of differences is a standard deviation of the differences.

9. A method as in claim 1 further comprising temporarily storing the series of differences in a buffer and setting a buffer size to correspond to the predetermined period.

10. A method as in claim 9 wherein steps (d) and (e) further comprise:

establishing a threshold level for each of a plurality of severity levels;

comparing the characteristic to each of said threshold levels, and

issuing a severity level alarm for each of said threshold levels exceeded by the characteristic.

11. A method to detect a change in a condition of an operating system comprising:

a. sensing the condition of the system and capturing data values indicative of the sensed condition;

b. periodically determining a difference between a first data value and a second data value;

c. determining a characteristic representative of a series of differences representative of a predetermined period;

d. comparing the characteristic to a plurality of threshold levels, wherein each level corresponds to a severity alarm level, and

e. generating the severity alarm level if the characteristic is beyond the corresponding threshold level and if the system is at a predetermined operating mode during a period corresponding to the series of differences.

12. A method as in claim 11 wherein the predetermined operating mode is an operating speed above a predetermined speed mode.

13. A method as in claim 11 wherein the predetermined operating mode is system rotational speed above a predetermined rotational speed.

14. A method as in claim 11 wherein step (e) further comprises disabling the severity alarm level

generation if a number of invalid differences exceeds a predetermined number.

15. A method as in claim 11 wherein the system is an operating machine.

16. A method as in claim 11 wherein the condition is vibration in the system.

17. A method as in claim 11 wherein the condition is a temperature of the system.

18. A method as in claim 11 wherein said data is collected at a predetermined time interval and further comprising collecting time data indicative of a time corresponding to an occurrence of each data value.

19. A method as in claim 11 wherein the characteristic representative of the series of differences is an mean value of the differences.

20. A method as in claim 11 wherein the characteristic representative of the series of differences is a median value of the differences.

21. A method as in claim 11 wherein the characteristic representative of the series of differences is a standard deviation of the differences.

22. A method as in claim 11 further comprising temporarily storing the series of differences in a buffer and setting a buffer size to correspond to the predetermined period.

23. A trend detection system comprising:

a sensor monitoring a condition of an operating machine or process and generating sensor data;

a computer controller receiving the sensor data and periodically storing said sensor data, said controller further comprising:

a latch temporarily storing a first sensor data value and a second sensor data value;

a difference logic function determining a difference value between the first and second sensor data values;

a buffer storing a sequence of difference values inputted from the difference logic function;

a logic function determining a characteristic of the sequence of difference values in said buffer;

a comparator logic function determining whether said characteristic is beyond a predetermined threshold level, and

a severity level alarm function generated if said comparator logic determines the characteristic is beyond the threshold level.

24. A trend detection system as in claim 23 wherein said condition is an operating characteristic of the machine.

25. A trend detection system as in claim 23 wherein said condition is a vibration level of the machine.

26. A trend detection system as in claim 23 wherein said condition is a temperature level of the machine.

27. A trend detection system as in claim 23 wherein said sensor data is collected at predetermined time intervals.